WHAT IS CLAIMED IS:

1. A color image processing apparatus comprising:

patch image output means for outputting patch image data generated from patch data stored in storage areas;

patch data extracting means for receiving read data obtained by reading, by means of a scanner, a patch image which is formed corresponding to the patch image data output from the patch image data output means, and extracting a read patch data from the read data;

gradation estimating means for estimating a record gradation of the patch data on the basis of the read patch data extracted by the patch data extracting means; and

correction output means for correcting an input color image signal on the basis of the record gradation estimated by the gradation estimating means and the patch data stored in the storage area, and for outputting the corrected signal.

2. A color image processing apparatus according to claim 1, wherein the gradation estimating means and correction output means include:

pulse width selection table setting means for estimating the record gradation of the patch data on the basis of the read patch data extracted by the patch data extracting means and for setting a pulse width

selection table on the basis of the estimated record gradation and the patch data stored in the storage area; and

pulse width output means for selecting a pulse width based on the pulse width selection table set by the pulse width selection table setting means, and for outputting an input color image signal in accordance with the selected pulse width.

3. A color image processing apparatus according to claim 1, wherein the gradation estimating means and correction output means include:

gradation correction table setting means for estimating the record gradation of the read patch data on the basis of the read patch data extracted by the patch data extracting means, and for setting a gradation correction table on the basis of the estimated record gradation and the patch data stored in the storage area; and

gradation correction output means for correcting the gradation of an input color image signal on the basis of the gradation correction table set by the gradation correction table setting means, and for outputting the corrected color image signal.

4. A color image processing apparatus according to claim 1, wherein the gradation estimating means and correction output means include:

pulse width selection table setting means for

estimating the record gradation of the read patch data
on the basis of the read patch data extracted by the
patch data extracting means and for setting a pulse
width selection table on the basis of the estimated

5   record gradation and the patch data stored in the
storage area;

second patch image output means for outputting
second patch image data, by using the pulse width
selection table set by the pulse width selection table

10   setting means, corresponding to the second patch data
for creating a gradation correction table which is
stored in a second storage area;

second patch data extracting means for receiving
second read data obtained by reading, by means of a

15   scanner, a second patch image which is formed
corresponding to the second patch image data output
from the second patch image output means, and for
extracting second read patch data from the second patch
image;

20   second gradation estimating means for estimating
gradation of the second read patch data on the basis of
the second read patch data extracted by the second
patch data extracting means;

gradation correction table setting means for

25   setting a gradation correction table on the basis of
the record gradation of the second read patch data
estimated by the second gradation estimating means and

the second patch data; and

correction output means for correcting an input color image signal on the basis of the pulse width selection table set by the pulse width selection table setting means and the gradation correction table set by the gradation correction table setting means, and for outputting the corrected signal.

5. A color image processing apparatus according to claim 2, wherein the pulse width selection table setting means includes

pulse width selection table setting means for pre-processing the read patch data extracted by the patch data extracting means after changing ordinary input γ characteristic settings to linear settings, for estimating the record gradation of the patch data from the preprocessed read patch data, and for setting a pulse width selection table on the basis of the estimated record gradation and the patch data stored in the storage area.

6. A color image processing apparatus according to claim 3, wherein the gradation correction table setting means includes pulse width selection setting means for pre-processing the read patch data extracted by the patch data extracting means after changing ordinary input γ characteristic settings to linear settings, for estimating the record gradation of the read patch data from the preprocessed read patch data,

and for setting a gradation correction table on the basis of the estimated record gradation and the patch data stored in the storage area.

7. A color image processing apparatus according to claim 1, wherein the gradation estimating means includes

gradation estimating means for finding C, M, Y, and K record area rates on the basis of the given read patch data and for estimating the record gradation of the patch data on the basis of the found C, M, Y and K record area rates.

8. A color image processing apparatus according to claim 1, wherein the gradation estimating means includes

gradation estimating means for finding C, M, Y, and K record densities on the basis of the given read patch data and for estimating the record gradation of the patch data on the basis of the found C, M, Y and K record densities.

9. A color image processing apparatus according to claim 1, wherein the gradation estimating means includes

gradation estimating means for estimating the record gradation of the patch data by receiving the estimated density from a density estimator estimating the density and the area rate from an area rate estimator estimating the area rate, based on the given

read patch data, and for outputting one of the
estimated density and the area rate.

10. A color image processing apparatus according
to claim 1, wherein the gradation estimating means
5   includes

means for estimating record gradation by receiving
a plurality of pieces of estimated gradation
information from a plurality of gradation estimators
estimating record gradation on the basis of the given
10   read patch data, using reference tables, and by
selecting and outputting one of the pieces of estimated
gradation information.

11. A color image processing apparatus comprising:

first patch image output means for outputting
15   first patch image data on the basis of the first patch
data for creating a pulse width selection table stored
in the first storage area;

first patch data extracting means for reading,
using a scanner, a first patch image which is formed
20   corresponding to first patch image data output from the
first patch image output means, and for extracting
first patch data in accordance with the first patch
image;

first gradation estimating means for estimating
25   record gradation of the first read patch data, from the
first read patch data extracted by the first patch data
extracting means;

pulse width selection table setting means for setting a pulse width selection table on the basis of the record gradation of the first read patch data estimated by the first gradation estimating means and

5   the first patch data;

second patch image output means for outputting second patch image data, using the pulse width selection table set by the pulse width selection table setting means, corresponding to the second patch data

10   for creating a gradation correction table stored in the second storage area;

second patch data extracting means for reading, using a scanner, a second patch image which is formed corresponding to the second patch image data output

15   from the second patch image output means, and for extracting second read patch data in accordance with the second patch image;

second gradation estimating means for estimating the record gradation of the second read patch data on

20   the basis of the second read patch data extracted by the second patch data extracting means;

gradation correction table setting means for setting a gradation correction table on the basis of the record gradation of the second read patch data

25   estimated by the second gradation estimating means and the second patch data;

third patch image output means for outputting

third patch image data, using the pulse width selection
table set by the pulse width selection table setting
means and the gradation correction table set by the
gradation correction table setting means and on the

5   basis of the third patch data for creating a color
conversion table stored in a third storage area;

third patch data extracting means for reading,
using a scanner, a third .patch image represented by
third patch image data output by the third patch image

10   output means, and for extracting third patch data
according to the third read patch image;

color conversion table setting means for setting a
color conversion table on the basis of the third read
patch data extracted by the third patch data extracting

15   means and the third patch data; and

correction output means for correcting a given and
input color image signal on the basis of the pulse
width selection table set by the pulse width selection
setting means, the gradation correction table set by

20   the gradation correction table setting means, and the
color conversion table set by the color conversion
table setting means, and for outputting the corrected
signal.

12.   A color image processing apparatus according

25   to claim 11, wherein the pulse width selection table
setting means include

pulse width selection setting means for

pre-processing the read patch data extracted by the patch data extracting means after changing ordinary input γ characteristic settings to linear settings, for estimating the record gradation of the read patch data

5 from the preprocessed read patch data, and for setting a gradation correction table on the basis of the estimated record gradation and the patch data stored in the storage area; and

wherein the gradation correction table setting

10 means include gradation correction table setting means for pre-processing the read patch data extracted by the patch data extracting means after changing ordinary input γ characteristic settings to linear settings, for estimating the record gradation of the read patch data

15 from the preprocessed read patch data, and for setting a gradation correction table on the basis of the estimated record gradation and the patch data stored in the storage area.

13. A color image processing apparatus according

20 to claim 11, wherein the gradation estimating means includes

gradation estimating means for finding C, M, Y, and K record area rates on the basis of the given read patch data and for estimating the record gradation of

25 the patch data from the area rates.

14. A color image processing apparatus according to claim 11, wherein the gradation estimating means

includes

gradation estimating means for finding C, M, Y, and K record densities on the basis of the given read patch data and for estimating the record gradation of the patch data from the densities.

16. A color image processing apparatus according to claim 11, wherein at least one of the first and second gradation estimating means includes

gradation estimating means for estimating the record gradation of the patch data by receiving the estimated density from a density estimator estimating the density and on the basis of the given read patch data and the area rate supplied from an area rate estimator estimating the area rate, and for outputting one of the estimated density and the area rate.

16. A color image processing apparatus according to claim 11, wherein at least one of the first and second gradation estimating means includes

means for estimating record gradation by receiving a plurality of pieces of estimated gradation information from a plurality of gradation estimators estimating record gradation from the given read patch data and selecting and outputting one of the pieces, by using reference tables.

17. A color image forming apparatus comprising:

a color scanner for reading a color image from a given original and outputs color image data;

a color printer for forming an image on
a recording medium in accordance with the given color
image data;

patch image forming means for forming a patch

5   image on the recording medium in accordance with a
patch data stored in storage areas, by using the image
forming means;

patch data extracting means for extracting read
patch data from image data obtained by reading the

10   patch image formed by the patch image forming means,
using the color scanner;

gradation estimating means for estimating record
gradation of the patch data on the basis of the read
patch data extracted by the patch data extracting

15   means;

correction output means for correcting a given and
input color image signal on the basis of the record
gradation estimated by the gradation estimating means
and the patch data stored in the storage area; and

20   forming means for forming an image on a recording
medium, using a color printer, in accordance with the
color image signal corrected and output from the
correction output means.

18. A color image forming apparatus comprising:

25   a color scanner for reading a color image from a
given original and for outputting color image data;

a color printer for forming an image on a

recording medium in accordance with the color image
data;

first patch image forming means for forming, using
the color printer, first patch image on a recording

5   medium in accordance with the first patch data for
creating a pulse width selection table, which is stored
in first storage area;

first patch data extracting means for extracting
first read patch data from the read image data obtained

10 by reading, using the color scanner, the first patch
image formed by the first patch image forming means;

first gradation estimating means for estimating
record gradation of the first read patch data on the
basis of the first read patch data extracted by the

15 first patch data extracting means;

pulse width selection table setting means for
setting a pulse width selection table on the basis of
the record gradation of the first patch data estimated
by the first gradation estimating means;

20 second patch image forming means for forming a
second patch image on a recording medium using the
color printer and the pulse width selection table set
by the pulse width selection table setting means on the
basis of the second patch data for creating a gradation

25 correction table stored in the second storage area;

second patch data extracting means for extracting
second read patch data from read image data obtained by

reading, using the color scanner, the second patch image output by the second patch image forming means;

second gradation estimating means for estimating record gradation of the second read patch data on the basis of the second read patch data estimated by the second patch data extracting means;

gradation correction table setting means for setting a gradation correction table on the basis of the record gradation of the second read patch data estimated by the second gradation estimating means and the second patch data;

third patch image output means for forming a third patch image on a recording medium with the color printer, using the pulse width selection table set by the pulse width selection table setting means and the gradation correction table set by the gradation correction table setting means on the basis of third patch data for creating a color conversion table stored in the third storage area;

third patch data extracting means for extracting third read patch data from read image data obtained by reading a third patch image formed by the third patch image forming means, using the color scanner;

color conversion table setting means for setting a color conversion table on the basis the third read patch data extracted by the third patch data extracting means and the third patch data;

correction output means for correcting an input
color image signal on the basis of the pulse width
selection table set by the pulse width selection
setting means, the gradation correction table set by
5   the gradation correction table setting means, and the
color conversion table set by the color conversion
table setting means and output the corrected signal;
and

forming means for forming, using the color printer,
10   an image on a recording medium in accordance with the
color image signal corrected and output by the
correction output means.